



Technical Data

Ferguson Metals, Inc. ♦ Hamilton, Ohio

Nickel-Base Superalloy

Type 718

(UNS Designation N07718)

GENERAL PROPERTIES

Type 718 alloy (N07718) is an austenitic nickel-base superalloy which is used in applications requiring high strength to approximately 1400°F (760°C) and oxidation resistance to approximately 1800°F (982°C). In addition, the alloy exhibits excellent tensile and impact strength even at cryogenic temperatures.

High strength at room and elevated temperatures is developed by a precipitation heat treatment at 1325°F (718°C) with cooling and a hold at 1150°F (621°C).

The relatively slow response to precipitation hardening permits repair welding of the Type 718 Alloy even in the aged condition.

Type 718 alloy is available in plate, sheet and strip. The alloy is generally supplied in the solution treated condition.

CHEMICAL COMPOSITION

Typical Analysis

Element	Percent
Carbon	0.08 max
Manganese	0.35 max
Phosphorus	0.015 max
Sulfur	0.015 max
Silicon	0.35 max
Chromium	17 - 21
Nickel	50 - 55
Molybdenum	2.80 - 3.30
Columbium	4.75 - 5.50
Titanium	0.65 - 1.15
Aluminum	0.20 - 0.80
Cobalt	1.00 max
Boron	0.006 max
Copper	0.30 max
Tantalum	0.05 max
Iron	Balance

RESISTANCE TO CORROSION AND OXIDATION

Type 718 alloy has good resistance to oxidation and corrosion at temperatures in the alloy's useful strength range in atmospheres encountered in jet engines and gas turbine operations.

PHYSICAL PROPERTIES

Typical Values

	Annealed Condition	Aged Condition
Density	0.296 lb./in ³ 8.19 g/cm ³	0.297 lb./in ³ 8.22 g/cm ³
Specific Gravity	8.19	8.22

THERMAL CONDUCTIVITY

Temperature Range		Thermal Conductivity	
°C	°F	Btu-ft/ft ² h-°F	W/m-°K
0-100	32-212	6.5	11.2

ELECTRICAL RESISTIVITY AT 68°F (20°C)

Annealed	127 microhm-cm
Aged	121 microhm-cm

MECHANICAL PROPERTIES

Room Temperature Properties

The room temperature strength of the Type 718 alloy is substantially increased by precipitation heat treatment as the following data indicate. These values are properties specified for sheet, strip and plate in AMS 5596 and AMS 5597

SOLUTION TREATED

Yield Strength (0.2% Offset)	Ultimate Tensile Strength	Elongation (% in 2")
Sheet and Strip		
80,000 psi (max)	140,000 psi (max)	30 (min)
550 MPa (max)	965 MPa (max)	
Plate		
105,000 psi (max)	150,000 psi (max)	30 (min)
725 MPa (max)	1,035 MPa (max)	
Solution Treated plus Precipitation Heat Treatment		
Yield Strength (0.2% Offset)	Ultimate Tensile Strength	Elongation (% in 2")
150,000 psi (min)	180,000 psi (min)	12 (min)
1,035 MPa (min)	1,240 MPa (min)	

TYPICAL SHORT TIME TENSILE PROPERTIES

AS A FUNCTION OF TEMPERATURE

Typical short time tensile properties as a function of temperature are shown here for material solution treated and aged as follows:

Solution Treatment:	1800°F (982°C) 1 hour
Precipitation Treatment:	1325°F (718°C) 8 hours
	Furnace Cool at 100°F (55°C)
	per hour to 1150°F (621°C)
	1150°F (621°C) 8 hours

Data shown are typical, and should not be construed as maximum or minimum values for specification or for final design. Data on any particular piece of material may vary from those shown herein.